# The Natural Force of FIRE

**Summer 2001**

Fire, climate, erosion, and a vast assortment of lifeforms ranging from microbes to insects to mammals, including humans, have all played roles in the creation of the vegetative landscape of Yellowstone. Vegetation here has adapted to fire and, in some cases, may be dependent on it.

Ecologists have known for many years that wildfire is essential to the evolution of a natural setting. Records kept in Yellowstone since 1931 show that lightning starts an average of 22 fires each year. Large-scale fires burn through the conifer forests of the Yellowstone plateau every 250 to 400 years and take place in the low-elevation grasslands on average every 25 to 60 years. When fires are suppressed, the habitat gradually becomes less diverse. This, in turn, affects the variety of animals able to successfully inhabit a particular area.

In the first few decades after Yellowstone was established as the world's first national park in 1872, no effective fire fighting was done. Then, during the Army administration of Yellowstone (1886–1918), fire suppression occurred most frequently on the grasslands of the Northern Range. Throughout the rest of the park, which is largely covered by lodgepole pine forest, reliable and consistent fire suppression began with the era of modern airborne firefighting techniques of the past 30 to 40 years.

In natural areas such as Yellowstone National Park, preserving a state of wildness is a primary goal of management. In 1972, Yellowstone was one of several national parks that initiated programs to allow some naturally caused fires to burn. Between then and 1988, scientists learned much about the occurrence and behavior of fire. For example, eighty percent of the lightning starts in this period went out by themselves.

## The Historic Fires of 1988

### *Facts About the 1988 Fires*

- The summer of 1988 was the driest in the history of Yellowstone National Park.
- 9 fires caused by humans; 42 fires caused by lightning.
- 36% of the park burned (793,880 acres).
- Fires begun outside of the park burned more than half of the total acreage.
- About 300 large mammals, primarily elk, perished.
- $120 million spent fighting the fires.
- 25,000 people employed in these efforts.
- Until July 15, naturally-caused fires allowed to burn. After that, all fires fought, regardless of their cause.
- Largest fire-fighting effort in the history of the U.S.
- Effort saved human life and property, but probably had little impact on the fires themselves.
- Rain and snow finally stopped the advance of the fires in September.

The summer of 1988 was the driest on record in Yellowstone. Though substantial precipitation fell during April and May, practically no rain fell in June, July, or August—an event previously unrecorded in the park's 112-year written record of weather conditions. In early summer, about 20 lightning-caused fires had been allowed to burn, and eleven of these fires burned themselves out.

But fires that continued to burn into the extremely dry weeks of late June and July met dramatically changed conditions. By late July, moisture content of grasses and small branches had dropped as low as 2 or 3 percent, and downed trees measured at 7 percent (kiln-dried lumber is 12 percent). After July 15, no new natural fires were allowed to burn and after July 21, all fires were fought.

The extreme weather conditions and heavy, dry accumulations of "fuel" (vegetation of various types) presented conditions rarely observed. Typical firefighting techniques were frequently ineffective because fires spread long distances by "spotting," a phenomenon in which wind carries embers from the tops of 200-foot flames far across unburned forest to start spot fires well ahead of the main fire. Fires routinely jumped barriers that normally stopped them such as rivers, roads, and major topographic features such as the Grand Canyon of the Yellowstone River. Fires advanced rapidly, making frontal attacks dangerous and impossible.

By the last week of September, about 50 lightning-caused fires had occurred in the park, 8 of which were still burning. More than $120 million had been spent on fire control efforts in the greater Yellowstone area, and most major park developments—and a few surrounding communities—had been evacuated at least once as fire approached within a few miles of them. At the operation's peak, 9,000 firefighters (including Army and Marine units), more than 100 fire engines, and dozens of helicopters participated in the complex effort to control the fires and protect developments. It was the largest such cooperative effort ever undertaken in the United States.

*Protecting the Old Faithful Inn, 1988* *NPS /Henry*

*The human face of fire* *NPS/Henry*

### *After the Fires*

The 1988 fires created a mosaic of burns, partial burns, and unburned areas that provided new habitats for plants and animals.

- Fertile soils with good water-holding capacity and dense, diverse vegetation before the fire recovered quickly.
- Soils that supported very little vegetation before the fires have continued to have very little vegetation.
- Many of the forests burned in 1988 were mature lodgepole stands, and this species is now recolonizing most of the burned areas.
- The first seedlings of Engelmann spruce, subalpine fir, and Douglas-fir are emerging.
- Whitebark pine seedlings have appeared in all 275 study plots.
- Fire enhanced aspen reproduction and young aspens now grow throughout the park in burned areas.
- The fires have had no discernible impact on the number of grizzly bears in greater Yellowstone.
- Cavity-nesting birds, such as bluebirds, have had more dead trees for their nests; birds dependent on mature forests, such as boreal owls, lost habitat.
- Cutthroat trout spawning habitat has not been harmed, nor have the number of spawning streams declined.
- No discernible fire-related effects have been observed in the fish populations or the angling experience in the six rivers that have been monitored regularly since 1988.
- Vegetation growth has slowed erosion in watersheds that had erosion and mudslides after the fires, such as the Gibbon River.

### *The National Fire Plan*

The 2000 fire season caught the attention of the American public when almost 93,000 wildland fires burned close to 7.4 million acres and destroyed numerous structures. President Clinton asked the Secretaries of Agriculture and the Interior to develop recommendations on how to reduce the impacts on fire on rural communities and ensure sufficient firefighting resources for the future. A report was presented to the President on September 8, 2000, and came to be known as the "National Fire Plan." The plan identified five key points that continue to emphasize interagency approaches:

- Firefighting: Continue to fight fires and be adequately prepared for next year.
- Rehabilitation and Restoration: Restore landscapes and rebuild communities damaged by the wildfires of 2000.
- Hazardous Fuel Reduction: Invest in projects to reduce fire risk.
- Community Assistance: Work directly with communities to ensure adequate protection.
- Accountability: Be accountable and establish adequate oversight, coordination, program development, and monitoring for performance.

The House and Senate approved an appropriations bill that funded most of the recommended actions. The bill contains about $2.8 billion in funding for the five land management agencies involved in wildland fire management. Of this sum, $101 million is for National Park Service projects and activities identified in the National Fire Plan.